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Revised concept of the genus *Euryporus* Erichson (Coleoptera, Staphylinidae, Staphylininae) and phylogenetic significance of Staphylinini from New Guinea

Alexey Solodovnikov[1]

1 *Zoological Museum, Natural History Museum of Denmark, Universitetsparken 15, Copenhagen 2100, Denmark*

Corresponding author: *Alexey Solodovnikov* (asolodovnikov@snm.ku.dk)

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Abstract

The Staphylinini rove beetle genus *Euryporus* Erichson from the subtribe Quediina is restricted to include only three species from the Western Palearctic region: *E. picipes* (Paykull, 1800), *E. aeneiventris* (Lucas, 1846), and *E. princeps* Wollaston, 1864. *Euryporus argentatus* Fauvel, 1881, *E. warisensis* Last, 1987 and *E. multicavus* Last, 1980, which do not even belong to the subtribe Quediina, are excluded from the genus. Of these, two were transferred to different genera: *Tympanophorus argentatus* (Fauvel, 1881), **comb. nov.**, from Sumatra; and *Hesperus warisensis* (Last, 1987), **comb. nov.**, from New Guinea. "*Euryporus*" *multicavus* could not be placed to any of the described genera of Staphylinini and is left as *incertae sedis* pending a broader study of the relevant fauna of this tribe in New Guinea and adjacent regions. The taxonomic history of *Euryporus* is reviewed, and an updated diagnosis of this genus is provided.

Keywords

Euryporus, *Tympanophorus*, *Hesperus*, Quediina, Anisolinina, Philonthina, Staphylinini, New Guinea

Introduction

An abundance of large and polyphyletic, poorly defined genera is a drawback of the current classification of the hyper-diverse rove beetle tribe Staphylinini (e.g., "*Quedius*-complex" discussed in Solodovnikov 2006). By including numerous unrelated species

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together, such "genera" inhibit species discovery and taxonomic revisions, and they introduce "noise" in any evolutionary study of rove beetles. However, a number of monobasic or species-poor genera of Staphylinini suffer from the flawed definition too.

One such small genus that nevertheless turned out to be a taxonomic "waste basket" is *Euryporus* Erichson, 1839 from the subtribe Quediina. Prior to this paper *Euryporus* comprised three well-known species from the Western Palearctic region (*E. picipes* (Paykull, 1800) (Fig. 1), *E. aeneiventris* (Lucas, 1846), and *E. princeps* Wollaston, 1864), and three poorly known "exotic" species: *Euryporus argentatus* Fauvel, 1881 from Sumatra (Fig. 2), as well as *E. warisensis* Last, 1987 (Figs 3–7) and *E. multicavus* Last, 1980 (Figs 8–11) from New Guinea. Poor descriptions of these "exotic" species coupled with the unusual disjunct distribution of the genus cast strong doubts on the monophyly of *Euryporus* and triggered this study.

Examination of the relevant types made the misplacement of all three "exotic" species in *Euryporus* immediately obvious. But while the correct identity of *E. argentatus* and *E. warisensis* as members of the genera *Tympanophorus* Nordmann, 1837 and *Hesperus* Fauvel, 1874, respectively, also became clear, proper classification of *E. multicavus* faced a problem of poor generic limits in the subtribes Philonthina and Anisolinina, and even a problem of blurred limit between these subtribes (Schillhammer 2004). In such circumstances, a broader phylogenetic analysis embracing relevant lineages from these and related subtribes of Staphylinini would be required. For the poorly known fauna of New Guinea and adjacent regions such analysis was impossible without prior extensive taxonomic study of many species, which was far beyond the scope and goals of this paper. Therefore, *E. multicavus* is explicitly removed from *Euryporus* but left as *incertae sedis* within Staphylinini pending further study.

Material and methods

The paper is based on the material from the following institutions:

BPBM	Bernice P. Bishop Museum, Honolulu (S. Myers)
HNHM	Hungarian Natural History Museum, Budapest (G. Makranczy)
MMUE	Manchester Museum, the University of Manchester (D. Logunov)
NCBN	Netherlands Centre for Biodiversity Naturalis, the Netherlands (M.E. Gassó Miracle and A. van Assen)

Labels of the examined types are quoted verbatim; data from each label are separated by a slash [/].

Photos in Figs 3 and 8 were taken by the author with an MP-E 65 mm lens for Canon EOS 40D; those in Figs 2, 4–7, and 9–11 were taken by Ken Puliafico (Copenhagen) with a Leica DFC 420 camera attached to a Leica MZ16A microscope with the aid of Leica Application Suite (Leica Microsystems, 2003-2007) and Automontage

Pro (Synoptics Ltd, 1997–2004). The photo in Fig. 1 was produced and kindly provided by Harald Schillhammer (Vienna).

Correspondence of the locality names from old collection labels to modern toponyms was checked with the on-line resource (http://isodp.hof-university.de/fuzzyg/query/).

Genus *Euryporus* Erichson, 1839

http://species-id.net/wiki/Euryporus

Type species. *Oxyporus picipes* Paykull, 1800 (fig. 1).

Taxonomic history. The rove beetle genus *Euryporus* Erichson, 1839 was described by Nordmann (1837) as *Pelecyphorus* to include one European species *E. picipes* (Paykull, 1800) (Fig. 1). Since *Pelecyphorus* Nordmann, 1837 (nec *Pelecyphorus* Dejean, 1834) was a preoccupied name, Erichson (1839) replaced it with *Euryporus* and described the second species in the genus, *E. puncticollis* from North America (Erichson 1840). Soon, *E. aeneiventris* Lucas, 1846 and *E. princeps* Wollaston, 1864, both from the West Palearctic region were added (Lucas 1846; Wollaston 1864). Later Fauvel (1881, 1884) described *E. argentatus* Fauvel, 1881 and *E. flavipes* Fauvel, 1884, both from Sumatra. On the contrary, two species were removed from the genus: Sharp (1884) transferred Erichson's *E. puncticollis* to the genus *Tympanophorus* Nordmann, 1837, while Fauvel (1895) erected a new genus *Pammegus* (now with twelve species, in the subtribe Anisolinina) for his own species *E. flavipes.* Finally, Last (1980, 1987) described two more species in *Euryporus: E. multicavus* Last, 1980 and *E. warisensis* Last, 1987, both from Papua New Guinea.

As a result, the genus *Euryporus* included six species before this study (e.g., Herman 2001). Of them the type species *E. picipes* and two other West Palearctic species, *E. aeneiventris,* and *E. princeps,* are very similar to each other and rather well-known (e.g., Coiffait 1978, Assing and Schülke 2012). Examination of the type material for the "exotic" *E. argentatus*, *E. multicavus* and *E. warisensis* led to their exclusion from *Euryporus* as explained below.

Updated diagnosis, composition and phylogenetic relationships. Without the excluded taxa (see below), *Euryporus* comprises three species very similar to each other: *E. picipes* (Paykull, 1800) widely distributed in Europe (Fig. 1); the West Mediterranean *E. aeneiventris* Lucas, 1846; and *E. princeps* Wollaston, 1864, endemic to the Canary Islands. Male genitalia of all species were illustrated in Coiffait (1978).

Among other genera of the subtribe Quediina, *Euryporus* can be distinguished by the following combination of characters: fully developed infraorbital ridges; mandibles elongate with broad basal part but narrow and sharp apical portion; last segment of maxillary palps fusiform, slightly setose; last segment of labial palps enlarged, apically obliquely truncated, densely setose; first antennal segment elongate, as long as second and third antennal segments together; anterior tarsi narrow, not enlarged in both sexes; apical margin of abdominal sternite VIII in both sexes concave, in male without median incision. Other recent descriptions and synopses of the genus can be found in Coiffait (1978) and Assing and Schülke (2012).

Figure 1. *Euryporus picipes,* habitus.

For phylogenetic purposes adult (Solodovnikov 2006; Solodovnikov and Schomann 2009) and larval (Pietrykowska-Tudruj et al. 2011) morphology of *E. picipes* was scored in those character matrixes. The adult-based analysis (Solodovnikov and Schomann 2009) placed *Euryporus* in the subtribe Quediina (in the restricted sense of Chatzimanolis et al. 2010). Within Quediina, it may be related to the lineage formed by the genera *Anaquedius* Casey, 1915, *Hemiquedius* Casey, 1915, *Anchocerus* Fauvel, 1905, *Australotarsius* Solodovnikov et Newton, 2009, and *Acylophorus* Nordmann, 1837 (Solodovnikov and Schomann 2009; but see additional remarks about alternative hypotheses in Solodovnikov and Newton 2009). Although *Euryporus* was not included in the molecular study of

Chatzimanolis et al. (2010) because of unavailable DNA-quality material, the above mentioned lineage was recovered as monophyletic in the Bayesian analysis of that study. The larvae-based analysis (Pietrykowska-Tudruj et al. 2012) was inconclusive as far as sister relationships of *Euryporus* is concerned.

Species excluded from Euryporus

***Tympanophorus argentatus* (Fauvel, 1881), comb. n.**
http://species-id.net/wiki/Tympanophorus_argentatus
Figure 2

Type material examined. Indonesia: Holotype, female, "*Euryporus argentatus* Fvl. [in Fauvel's handwriting] / Suon Exp. Moeara Laboe 11/77 [circle label]/ Museum Leiden *Euryporus argentatus* det. Fauv. [pre-printed, partly handwritten curatorial label]/ *argentatus* Fauvel n. sp.[handwritten label]/ Holotype *Euryporus argentatus* Fauv. revised by A. Solodovnikov 2012 [red label]/ *Tympanophorus argentatus* (Fauvel) A. Solodovnikov det. 2012" (NCBN).

Comments. In the original description of *Euryporus argentatus,* Fauvel (1881) clearly mentioned a single type specimen from "Moeara Laboe" [= Moearalaboeh, now Propinsi Jambi, Indonesia, 1°29'0"S, 101°3'0"E]. Based on the habitus (Fig. 2) and other diagnostic characters, the holotype and other specimens of *Euryporus argentatus* from the collection of NCBN are conspecific and can be clearly identified as a species of the genus *Tympanophorus* Nordmann, 1837. With the possible exception of *T. schenklingi* Bernhauer, 1912 from the Afrotropical region, *Tympanophorus* (e.g., illustrated redescription in Naomi 1983) is monophyletic (Schillhammer 2004).

It is noteworthy that long after the description of *E. argentatus,* Fauvel (1902) did recognize the correct affiliation of that species. In a short note on page 42 he mentioned "*Tympanophorus argentatus* Fvl. (*rugosus* Waterh.)", apparently meaning a synonymy of his species with *T. rugosus* (C. Waterhouse, 1884). This so vaguely annotated transfer of *E. argentatus* to *Tympanophorus* was overlooked by later authors. For example Herman (2001) lists both *Euryporus argentatus* Fauvel, 1881 as a valid species and "*Tympanophorus argentatus* Fauvel", erroneously, as *nomen nudum*. Synonymy of *Tympanophorus argentatus* (Fauvel, 1881) and T. *rugosus* (C. Waterhouse, 1884) remains to be verified.

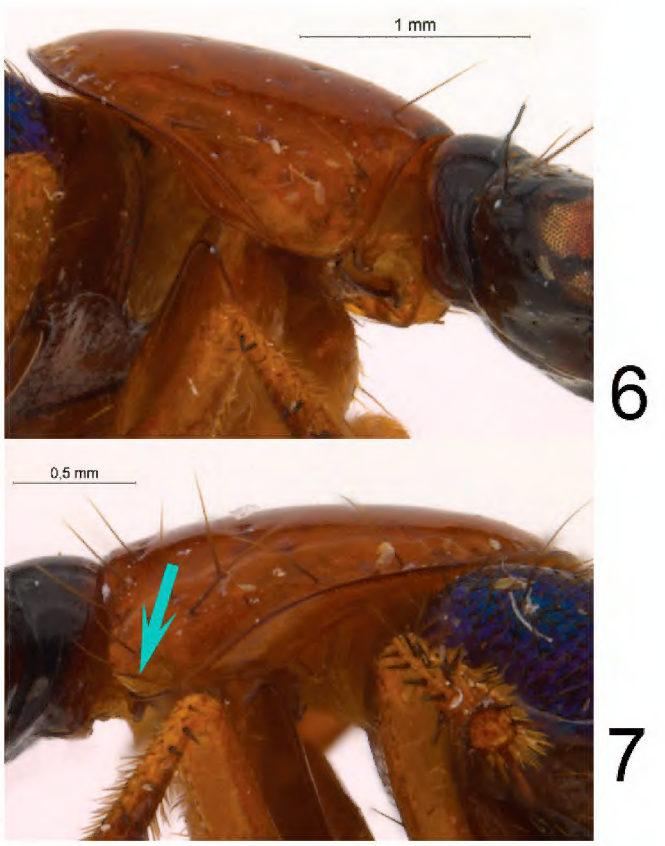
***Hesperus warisensis* (Last, 1987), comb. n.**
http://species-id.net/wiki/Hesperus_warisensis
Figures 3–7

Type material examined. Papua New Guinea: Holotype, female, "Holotype [red circular label]/ New Guinea Neth. Waris, S. of Hollandia, 450–500 m, VIII-16-23-1959/ T.C. Maa collector Bishop/ *Euryporus warisensis* sp. n. H.R. Last det., Holotype [H.R. Last's label]/ *Hesperus warisensis* (Last) A. Solodovnikov det. 2012" (BPBM).

Figure 2. *Tympanophorus argentatus,* holotype, habitus.

Although *E. warisensis* is strikingly different from the Palearctic *Euryporus* (cf. Figs 1 and 3), Last (1987) did not provide any justification for his generic placement. Based on the structure of head sutures (rudimentary infraorbital ridges, Fig. 5; present dorsal basal ridge on the neck), prothorax (laterally visible hypomera; superior marginal line turning downwards before anterior angles of pronotum, Fig. 6); anterior angles of pronotum not strongly protruding over anterior margin of prothorax), legs (lacking empodial setae) and other characters, *E. warisensis* is clearly not congeneric with *Euryporus* and in fact belongs to the subtribe Philonthina.

Because of its rather elongate mandibles and maxillary palps (Fig. 5), as well as habitus resemblance, *E. warisensis* could be associated with some species of *Hesperus* from New Guinea like *H. raynori* Last, 1987 and others. As pointed out in Schil-



Figures 3–7. *Hesperus warisensis,* holotype: **3** habitus **4** body in ventral view **5** head in ventral view **6** right side of pronotum in lateral view **7** left side of pronotum in lateral view. Blue arrow shows "fake" superior line of pronotum.

lhammer (2002) about *Hesperus* ["...this genus is a dumping ground for species matching a particular set of characters which can hardly suffice to justify a monogeneric treatment"], and demonstrated in the phylogenetic analysis (Li and Zhou 2011), this genus is not a monophyletic group and needs a revision. In such circumstances placement of *E. warisensis* in *Hesperus* is a practical solution pending further study. As far as I am aware (and personal communication of H. Schillhammer), the enlarged apical labial palpomeres of *E. warisensis* easily distinguish this species from any other known species of *Hesperus*.

It is noteworthy that on the left side of the pronotum (Fig. 7) the holotype of *Hesperus warisensis* displays a "fake" superior line extended towards anterior angles of pronotum, while the right side has no such structure (Fig. 6). Presumably, the left side of the pronotum in the holotype displays a slight teratology.

Euryporus multicavus Last, 1980, non *Euryporus*, Staphylinini *incertae sedis*

http://species-id.net/wiki/Euryporus_multicavus

Figures 8–11

Type material examined. Papua New Guinea: Holotype, male, "New Guinea SE Kiunga, 1.VIII. 1969/ No. NGK-R. 1 leg. Dr. Ballogh/ Holotypus 1980 male [symbol] *Euryporus multicosus* [sic!] Last [standard HNHM curatorial label] / *Euryporus multicosus* [sic!] sp. n. H.R. Last det., Type male [symbol] [H.R. Last's label]" (HNHM); paratype, male, "New Guinea SE Kiunga, 23.VII-2.VIII.1969/ No. NGK-B.3. leg. Dr. Ballogh/ *Euryporus multicavus* sp. n. H.R. Last det., Paratype [H.R. Last's label]/ Staphylinini genus nov.? A. Solodovnikov det. 2012" (MMUE).

Comments. As in the above described case, *Euryporus multicavus* is strikingly different from the Palearctic *Euryporus* in habitus (cf. Figs 1 and 8), but Last (1980) did not explain why his species was assigned to that genus. Based on the structure of head (rudimentary infraorbital ridges (Fig. 11); present dorsal basal ridge on the neck), prothorax (superior marginal line inflected inwards under anterior angles of pronotum; pronotal hypomera visible from lateral view; anterior angles of pronotum not strongly protruding over anterior margin of pronthorax), legs (lacking empodial setae) and other characters, it is clear that *E. multicavus* is not congeneric with *Euryporus* and even does not belong to the subtribe Quediina. On the other hand, the combination of characters of that species does not allow its unambiguous placement in any of the currently recognized subtribes of Staphylinini.

Because of the short and stout labial palps with dilated last segment, shape of the mandibles (Fig. 11), strongly foveate surface of the apical abdominal segments, and the overall habitus (Fig. 8) remotely resembling *Tympanophorus,* I assume that "*Euryporus" multicavus* is phylogenetically close to the *Tympanophorus*-lineage of the subtribe Anisolinina (as defined in Schillhammer 2004). But the absence of the elevated ridge on the mesosternum, absence of empodial setae, sexually dimorphic sternite VII (with slight medio-apical incision in male) and strongly reduced para-

8

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10

11

Figures 8–11. "*Euryporus*" *multicavus,* paratype: **8** habitus **9** body in ventral view **10** aedeagus in parameral view **11** head in ventral view.

mere of the aedeagus (Fig. 10), cast doubts on such affinity. At least the absence of empodial setae and extremely reduced paramere of the aedeagus are shared by "*Euryporus" multicavus* with several species from New Guinea described in the genera *Philonthus* and *Hesperus.* But, except *Hesperus warisensis* moved to that genus here, none of those species have robust and dilated labial palpi, and all of them differ from "*Euryporus" multicavus* in other details. It is possible that "*Euryporus" multicavus* represents a new genus whose description must be postponed until a more inclusive phylogenetic study of relevant lineages is performed. Such study should be based not only on an extensive taxonomic revision of the hitherto poorly described relevant species but also include additional material from the collections of Staphylinini from New Guinea and adjacent regions, which I am aware of and which have remained largely untouched by modern workers.

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